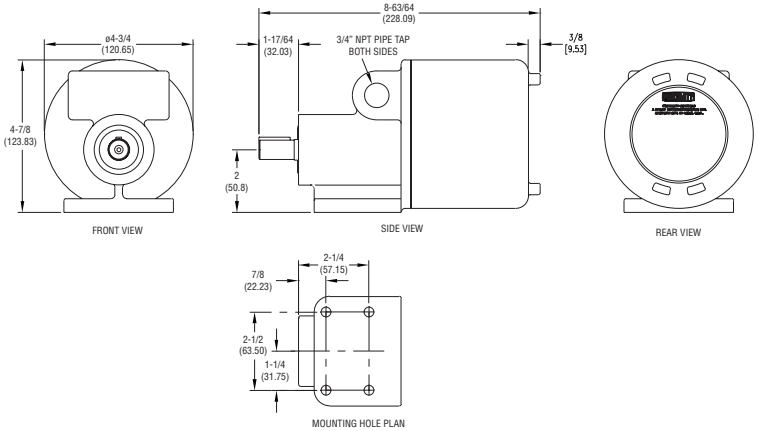
PROXIMITY®

Series DSS Direct-Contact Speed Switch

Specifications - Installation and Operating Instructions



The Series DSS Direct-Contact Speed Switch is a compact switch designed to include all mechanical and electronic components in one housing. It will produce an output signal at a predetermined speed which may be either over-speed, under-speed or zero-speed. Rugged, heavy-duty construction combined with solid state electronics and photo-electric technology makes this one of the most advanced motion detectors available. Series DSS protects all valuable rotating equipment including belt conveyors, bucket elevators, rotary feeders or screw conveyors. It operates in a clockwise or counter-clockwise direction and mounts in any position.

SPECIFICATIONS

Temperature Limits: -50° to 150°F (-45° to 65°C).
Enclosure: Aluminum with screw cover
Enclosure Rating: DSS-W: NEMA 3S, 4 & 4X. DSS-E: NEMA 3S, 4 & 4X, NEMA 7: Class I groups C & D, NEMA 9: Class II groups F & G.
Switch Type: DPDT.
Electrical Rating: 3A @ 120/240 VAC, 1/10 Hp @120/240 VAC.
Electrical Connections: Screw terminal.
Conduit Connections: (2) 3/4" female NPT.
Mounting Orientation: Any.
Set Point Adjustment: Adjustment screw.
Power Requirements: 105-135 VAC, 50/60 Hz, 210-250 VAC, 50/60 Hz; or 24 VAC/DC depending on model.
Power Consumption: 3 Watts.
Repeatability: 2% maximum at constant voltage and temperature.
Pick-up Point: 3 speed ranges at which relay will energize:

- **Low:** 0.1 to 10 RPM.
- **Medium:** 1 to 100 RPM.
- **High:** 10 to 1000 RPM.

Signal Point: Speed at which relay will de-energize. Recommended to be 15-20% lower than pick-up point.
Start-up Delay: Adjustable up to 45 seconds.
Radial Load on Input Shaft: 125 lbs maximum.
End Thrust on Input Shaft: 100 lbs maximum.
Rotation: Either clockwise or counter-clockwise.
Driving Torque: 1"/lb maximum.
Shaft: 5/8" diameter with 3/16" x 7/8" key.
Weight: 5 lbs (2.3 kg).

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OPERATING PRINCIPLE

The Series DSS Motion Switch senses motion by means of a precision metal disc mounted on the input shaft. This disc generates measurable light pulses by a series of slots on its periphery, which rotate past an infrared light source. A photo-electric sensor monitors the series of light pulses and converts them to digital electronic signals. Solid state circuitry then analyzes the digital signals and activates or de-activates the output relay at the pre-set speed.

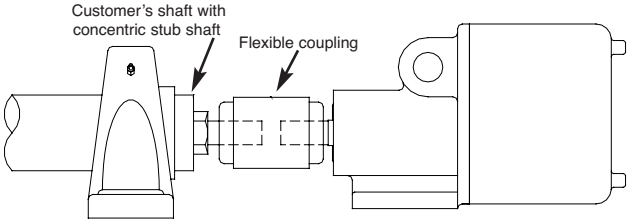
Field adjustment of the signal set point is easily accomplished by means of an adjustment screw on the electronics. For under-speed sensing, the signal point is set below the normal operating speed of the unit. The output relay will then de-energize if the speed drops below the signal point. For over-speed sensing, the pick-up point is set above the normal operating speed. The output relay will energize if the speed exceeds the pick-up point. Zero-speed sensing can be accomplished by turning the adjustment screw to its minimum setting. The output relay will then de-energize when the shaft speed of the unit approaches zero.

INSTALLATION

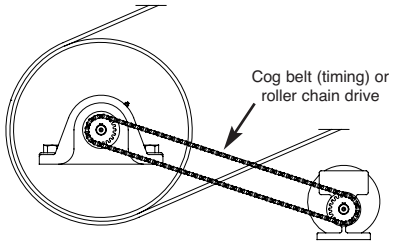
LOCATION & MOUNTING

The Series DSS motion switch can be mounted for operation in any position. The surface to which the switch is affixed should be as flat and as smooth as possible. Bearing brackets and shim plate sets can be used to mount the unit directly to the pillow block supporting a shaft. On installations where vibration conditions are not extreme, use 1/4” diameter machine bolts with lock washers through the four mounting holes in the base of the switch. (Mounting bolts and lock washers are not furnished with the switch.) If vibration conditions are extreme, use of a doweling is recommended through two mounting holes in the switch base. The switch should be mounted as axially in line, and/or parallel as possible to the existing shaft, which is to drive the switch. The Series DSS motion switch can be driven by one of the following means:

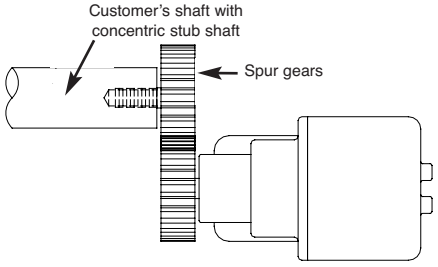
1. FIGURE 1: Suggested Coupling Arrangement, side view. Direct connection through a coupling (preferred means). Note: Switch should be concentric with the mating shaft. If stub is used, it must be concentric with the main shaft. If a stub shaft is required, we suggest the use of a 5/8” stub shaft. Use with a split or flexible type coupling.



2. FIGURE 2: Cog Belt Drive (timing) or Roller Chain Drive: A V-Belt drive is not as desirable because of possible slippage.

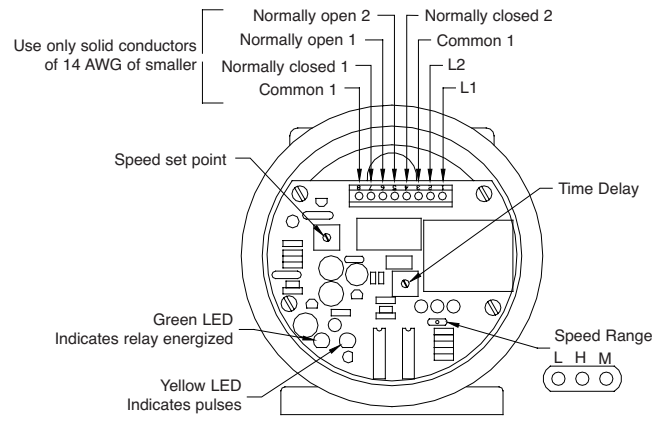


3. FIGURE 3: Suggested Spur Gear Arrangement (top view)



WIRING

FIGURE 4: Electronics View



Remove end cap to expose terminals and pick-up speed adjustment screw. Wire input power from source to terminals L1 & L2. Be certain to use the provided ground screw. The output of the Series DSS is a DPDT relay. There are two sets of output contacts. Each set includes normally open, normally closed and common. As a result, the unit can be used to control two separate circuits such as a motor starter and a signal light.

CONDUIT INSTALLATION:

Use only hubs of suitable sizes that are UL/CSA approved for WATERTIGHT use. Install per the hub manufacturer's instructions. Be sure the location selected will provide adequate wire bending space.

SIGNAL SET POINT

FOR USE AS AN UNDER-SPEED SWITCH:

Select the speed range required by changing the switch to LOW for 0.1 to 10 RPM, MEDIUM for 1 to 100 RPM and HIGH for 10 to 1000 RPM. Turn the set point potentiometer to the counter-clockwise stop. With motion present on the input shaft and at normal operating RPM, the yellow LED should blink. The green LED should turn on indicating that the output relay is energized. Slowly turn the set point adjustment screw clockwise until the output relay de-energizes. (A "click" will occur at this point.) Back up until the output relay energizes. Thus, when speed drops below the set point, the green LED should turn off indicating that the output relay is de-energized. If the normal operating speed of the input shaft exceeds 10 RPM for the LOW, 100 RPM for the MEDIUM or 1000 RPM for the HIGH, the unit should be adjusted as follows. Turn the set point adjustment screw clockwise until it reaches the stop. When the speed drops below 10 RPM for the HIGH, the relay will energize.

NOTE: Typically, the motor contact is wired in series with one of the NO output contacts and an alarm is wired with one of the NC output contacts.

FOR USE AS AN OVER-SPEED SWITCH:

Select the speed range required by changing the switch to LOW for 0.1 to 10 RPM, MEDIUM for 1 to 100 RPM and HIGH for 10 to 1000 RPM. Turn the set point potentiometer to the counter-clockwise stop. With motion present on the input shaft and at normal operating RPM, the yellow LED should turn on indicating that the output relay is energized. Slowly turn the set point adjustment screw clockwise until the output relay de-energizes and the green LED turns off. (A "click will occur at this point.) with the potentiometer on that setting, if the speed increases the output relay will energize.

NOTE: Typically, the motor contact is wired in series with one of the NO output contacts and an alarm is wired with one of the NC output contacts.

FOR USE AS A ZERO-SPEED SWITCH:

Select the LOW speed range by changing the switch to LOW for 0.1 to 10 RPM. Turn the set point potentiometer to the counter-clockwise stop. This will give a set point of 0.1 RPM. Thus, when the speed drops below 0.1 RPM, the output relay will de-energize.

NOTE: Wiring should be the same as for under-speed applications.

TIME DELAY SETTING

The Series DSS motion switch has a start-up delay that is adjustable up to 45 seconds. This setting should be set, depending on the application and the length of time it takes for the conveyor to reach its normal operating RPM. This time delay takes effect upon power-up of the Series DSS after shutdown. AC power to the Series DSS must be interrupted for timer to be reset. This delay only effects start-up, avoiding nuisance start-up alarms.

TROUBLESHOOTING PROBLEMS & SOLUTIONS

PROBLEM: SOLUTION:

No pulses from yellow LED: Check power supply.
Make sure input shaft is turning.

PROBLEM: SOLUTION:

Relay is not energized or de-energized: Check power supply. When expected. (I.e. green LED not on: Make sure input shaft is turning. Or off when expected.)
Check for proper set point.
Check for proper speed setting.
(LOW, MEDIUM or HIGH)

PROBLEM: SOLUTION:

Alarm sounds when equipment is started: Check start-up delay setting. Check for proper connections between alarm and relay. AC power must be interrupted for alarm to reset.

PROBLEM: SOLUTION:

Alarm does not go off when expected: Check power supply. Check for proper connections between alarm and relay.

PROBLEM: SOLUTION:

Equipment is not shut off when expected: Check power supply. Check for proper connections between control circuit and relay.

MAINTENANCE:

Upon final installation of the Series DSS Direct-Contact Speed Switch, no routine maintenance is required. A periodic check of the system calibration is recommended. The Series DSS is not field serviceable and should be returned if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization number before shipping.

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